REMARKS

Status of the Claims

Pending claims

Claims 1 to 15 are pending.

Claims amended and added in the instant amendment

In the present response, claims 1 to 5, 7, 8, 14 and 15 are amended; and new claims 16 to 27 are added. Thus, after entry of the instant amendment, claims 1 to 27 will be pending and under examination.

Both before and after the above changes and cancellations, and the addition of new claims, the invention was described in full, clear, concise, and exact terms and met all conditions for patentability under 35 USC 101 *et seq*. The scope of the claims of any resulting patent (and any and all limitations in any of said claims) shall not under any circumstances be limited to their literal terms, but are intended to embrace all equivalents.

Outstanding Rejections

Claims 1, 3, 5 to 13 and 15 are rejected under 35 U.S.C. §112, first paragraph. Claims 1 to 15 are rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 2 of U.S. Patent No. 5,958,751. Claims 1 to 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 1 of co-pending USSN 10/114,083. Applicants respectfully traverse all outstanding objections to the specification and rejection of the claims.

Support for the Claim Amendments

The specification sets forth an extensive description of the invention in the new and amended claims. Support for claims directed to nucleic acids having varying percent sequence identities to exemplary sequences of the invention can be found, inter alia, on page 9, second full paragraph and the paragraph spanning pages 9 and 10. Support for claims directed to polypeptides having varying percent sequence identities to exemplary sequences of the invention can be found, inter alia, on page 11, second full paragraph. Support for claims directed to

nucleic acids of the invention comprising sequences that hybridize under specific conditions to an exemplary sequence of the invention can be found, inter alia, on the paragraph spanning pages 5 and 6. Support for claims directed to methods using polypeptides having an α-galactosidase activity having conservative amino acid substitutions of an exemplary sequence of the invention can be found, inter alia, in the paragraph spanning pages 11 and 12. Support for claims directed to methods using polypeptides having an α-galactosidase activity having at least 30 or 50 amino acids of a portion of a sequence having at least 70% amino acid identity to an exemplary sequence of the invention can be found, inter alia, on page 11, second full paragraph.

Objections to the Claims

The Patent Office objected to claim 7 because of the phrase "wherein the raffinose is in raw beet sugar" for reasons of clarity. The instant amendment addresses this issue.

Issues under 35 U.S.C. §112, first paragraph

Enablement

The rejection of claims 1, 3, 5 to 13 and 15 under 35 U.S.C. §112, first paragraph, for allegedly not being enabled by the specification has been maintained, and is newly applied to claims added in Applicants' last response.

The Patent Office states that the specification is enabling for a method for hydrolyzing α-1,6-galactosyl bonds with the α-galactosidase of SEQ ID NO:4 (see section 10 of the office action).

However, it is alleged that the specification does not provide reasonable enablement for a method of hydrolyzing α-1,6-galactosyl bonds with the genus of α-galactosidases as claimed. In particular, it is alleged that the recited structural features of the claimed genera do not constitute a sufficient substantial portion of the genus to satisfy the requirements of section 112, first paragraph, for example, because there is no disclosure of the critical structural elements which correlate with of α-galactosidase activity. It is alleged that one of skill in the art would have to go through the burden of undue experimentation to isolate and/or make structural homologs of the exemplary polypeptide SEQ ID NO:4 and determine if those structural homologs have α-galactosidase activity (see, e.g., pages 5 and 6, section 13 of the office action).

Applicants respectfully maintain that the specification enabled the skilled artisan at the time of the invention to identify, and make and use, a genus of alpha galactosidases to practice the claimed invention. As declared by Dr. Jay Short (see attached Rule 132 declaration), the state of the art at the time of the invention and the level of skill of the person of ordinary skill in the art, e.g., screening enzymes, and nucleic acids encoding enzymes, for alpha galactosidase activity, was very high. As declared by Dr. Short, using the teaching of the specification, one skilled in the art could have selected routine methods known in the art at the time of the invention to express variants of nucleic acids encoding the exemplary enzyme of the invention and screen them for expression of polypeptides having alpha galactosidase activity. Dr. Short declares that one skilled in the art could have used routine protocols known in the art at the time of the invention, including those described in the instant specification, to screen for nucleic acids encoding polypeptides having 70% sequence identity to SEQ ID NO:4, or active fragments thereof, for alpha galactosidase activity. As declared by Dr. Short, while the numbers of samples needed to be screened may have been high, the screening procedures were routine and successful results (i.e., finding variant nucleic acids encoding alpha galactosidases) predictable. Furthermore, Dr. Short declares that it would not have required any knowledge or guidance as to which are the specific structural elements, e.g., amino acid residues, that correlate with alpha galactosidase activity to create variants of the exemplary nucleic acid and test them for the expression of polypeptides having alpha galactosidase activity. Accordingly, it would not have taken undue experimentation to make and use the claimed invention, including identification of a genus of nucleic acids encoding alpha galactosidases.

Whether large numbers of compositions (e.g., enzymes, antibodies, nucleic acids, and the like) must be screened to determine if one is within the scope of the claimed invention is irrelevant to an enablement inquiry. Enablement is not precluded by the necessity to screen large numbers of compositions, as long as that screening is "routine," i.e., not "undue," to use the words of the Federal Circuit. As the Patent Office correctly notes, the Federal Circuit in In re Wands directed that the focus of the enablement inquiry should be whether the experimentation needed to practice the invention is or is not "undue" experimentation. The court set forth specific factors to be considered.

One of these factors is "the quantity of experimentation necessary." Guidance as to how much experimentation may be needed and still not be "undue" was set forth by the Federal Circuit in, e.g. Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987). In Hybritech, Inc., a single deposited antibody producing cell line enabled a claim generic to all IgM antibodies directed to a specific antigen. The Federal Circuit noted that the evidence indicated that those skilled in the monoclonal antibody art could, using the state of the art and applicants' written disclosure, produce and screen new hybridomas secreting other monoclonal antibodies falling within the genus without undue experimentation. The court held that applicants' claims need not be limited to the specific, single antibody secreted by the deposited hybridoma cell line (significantly, the genus of antibodies was allowed even though only one antibody specie was disclosed). The court was acknowledging that, because practitioners in that art are prepared to screen large numbers of negatives in order to find a sample that has the desired properties, the screening that would be necessary to make additional antibody species was not "undue experimentation."

Analogously, practitioners of the biological sciences for the instant invention also recognize the need to screen numbers of negatives to find a sample that has the desired properties, e.g., alpha galactosidase activity. Furthermore, as declared by Dr. Short, the screening procedures used to identify polypeptide, and nucleic acids encoding them, within the scope of the instant invention (e.g., identifying nucleic acids encoding alpha galactosidases) were all well known in the art and at the time this application was filed. All were routine protocols for the skilled artisan. Thus, the skilled artisan using Applicants' written disclosure could practice the instant claimed invention without undue experimentation.

Enablement is not precluded by the necessity to screen large numbers of alternative compounds (e.g., nucleic acids or polypeptides), as long as that screening is "routine," i.e., not "undue." As declared by Dr. Short, it would have taken only routine protocols to make variants of the exemplary polypeptides (and the exemplary nucleic acids encoding them) and screen and identify those polypeptides and nucleic acids encoding them for alpha galactosidase activity. Thus, the specification enabled the skilled artisan at the time of the invention to make and use a broad genus of alpha galactosidase in the methods of the present invention.

Applicants also respectfully refer to recently issued claims directed to genuses of polynucleotides based on sequence identity (and stringent hybridization) to an exemplary nucleic acid, see, e.g., recently issued claims directed to, e.g., 72.5% sequence identity, as in USPN 6,593,514; 75% sequence identity, as in USPN 6,586,215; 80% sequence identity, as in USPN 6,596,926; 85% sequence identity, as in USPN 6,590,141 and USPN 6,586,179; 86% sequence identity, as in USPN 6,583,337; 90% sequence identity (and "stringent hybridization"), as in USPN 6,541,684 (see Exhibit A).

Accordingly, Applicants respectfully submit that the pending claims meet the written description and enablement requirements under 35 U.S.C. §112, first paragraph. In light of the above remarks, Applicants respectfully submit that amended claims are fully enabled by and described in the specification to overcome the rejection based upon 35 U.S.C. §112, first paragraph.

Issues regarding Double Patenting

Claims 1 to 15 are rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 2 of U.S. Patent No. 5,958,751. An appropriate Terminal Disclaimer under 37 CFR §§3.73(b) and 1.321(b) addressing this issue is attached.

Claims 1 to 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 1 of co-pending USSN 10/114,083. An appropriate Terminal Disclaimer under 37 CFR §§3.73(b) and 1.321(b) addressing this issue is attached.

CONCLUSION

In view of the foregoing amendment and remarks, Applicants respectfully aver that the Examiner can properly withdraw the rejection of the pending claims under 35 U.S.C. §112, first paragraph, and the provisional rejections under the judicially created doctrine of obviousness-type double patenting. Applicants respectfully submit that all claims pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

Applicants believe that no additional fees are necessitated by the present response and amendment. However, in the event any such fees are due, the Commissioner is hereby authorized to charge any such fees to Deposit Account No. 06-1050. Please credit any overpayment to this account.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (858) 678-5070.

Respectfully submitted,

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